
North Ridge Estates

Draft Site-Specific Sampling Plan

for Activity-Based Sampling

TDD: 03-07-0011

Ecology and Environment, Inc.

Contract: 68-S0-01-01

July 2004

Region 10

START

Superfund Technical Assessment and Response Team

START Sample Numbers: 04070001 through 04070200

SITE-SPECIFIC SAMPLING PLAN (SSSP)
FOR REMOVAL PROGRAM SITES

Project Name: North Ridge Estates

Technical Direction Document (TDD) Number: 03-07-0011

Contract Number: 68-S0-01-01

APPROVALS			
Name	Title	Signature	Date
Dan Heister	On-Scene Coordinator (OSC)		
Bill Mehnert	START Project Manager		
Mark Woodke	START Quality Assurance Officer		

This SSSP is prepared and used in conjunction with the Generic Superfund Technical Assessment and Response Team (START) Quality Assurance Project Plan (QAPP), January 2003, for collecting samples during Removal Program (RP) projects. Refer to the Generic START QAPP for additional details relating to the SSSP.

Additional Personnel and Affiliations involved in the project.

U. S. Environmental Protection Agency (EPA) Personnel			
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Physical Description and Contact Information

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Site Name	North Ridge Estates (See Figure 1-1; Site Location Map)	
Site Location	Address: Multiple lots. Approximately 5 miles NE of Klamath Falls on Old Fort Road.	
	City: Klamath Falls	
	State: Oregon	
	Latitude: 42° 15' 58" North	Longitude: 121° 44' 46" West
Property size	Acres: Approximately 80-100 impacted acres.	
Site Contact	Name: MBK Partnership	Phone Number:
Site Owner	Name: Multiple private property owners	Phone Number: NA
Nearest Residents	Distance: On the site.	Direction:
Primary land uses surrounding the site	Residential. (See Figure 1-2; Site Map)	
Years of operation	From: 1944 1946 1966	To: 1946 DoD 1964 Oregon Inst. Of Technology 2003 Several private owners

The Data Quality Objective process will be used to determine all sample locations; this process is further described in the Generic START QAPP.

Historical and Background Information

The MBK Partnership/North Ridge Estates Subdivision (MBKP) site is a residential subdivision that formerly contained a United States Marine Recuperation Barracks facility (Figure 1-1). Many components of this facility were composed of asbestos containing material (ACM).

The facility was occupied by the United States Department of Defense from 1944 to 1946. The Oregon Institute of Technology (OIT) then utilized the property until 1964. The property was purchased in 1966 by a group of investors and has been under private occupation since that time. Most of the original buildings (60-80) were demolished by the developers and salvageable materials (copper piping, wood, etc.)

were removed while ACM was left at the site. The property was purchased in 1977 by MBKP, the developer of North Ridge Estates. The construction of homes in the residential subdivision began in 1993.

In June 2001, ODEQ received a complaint (notification) of asbestos-insulated pipe on the surface of a residential lot in North Ridge Estates. Samples of the piping and fragments collected by ODEQ contained from 10% to 90% asbestos. A notice of non-compliance was issued to MBKP and the ACM was removed from the property by MBKP later that year. MBKP has removed and disposed over 49 tons of ACM from the development under a Mutual Agreement and Order (MAO) entered with ODEQ in May 2002 but additional requirements to investigate and mitigate on-site contamination could not be agreed upon between MBKP and ODEQ. EPA was requested by ODEQ to assist in the cleanup when discussions between ODEQ and MBKP did not produce a remedy. EPA issued an Action Memorandum in May 2003 to conduct a removal action at the property.

The potential threat to the population at risk is that the asbestos in soils may be inhaled. Asbestos has been detected in bulk samples collected by ODEQ from residential properties in the form of amosite and chrysotile.

During the summer and fall of 2003, START conducted composite asbestos and discrete lead soil sampling at over 20 residential properties located in North Ridge Estates. The RP consultant collected approximately 20 soil samples (both composite and discrete) and performed specific preparation and analyses on these samples to gauge the release of ACM fibers to the air. In addition, the RP consultant conducted outdoor asbestos air sampling at residential properties and indoor air sampling in the residences concurrently. START collected approximately 20% of these samples with side by side stands and air samplers. START also conducted ambient (high volume) air sampling at strategic locations throughout the property to measure ambient (outdoor) concentrations of asbestos throughout the site.

To supplement the previous sampling, this work plan will outline activity-based sampling in which air samples will be collected while performing common tasks that might be completed by residents or contracted workers. Sampling will be completed during the summer of 2004 to best characterize the impact of disturbing soils when there is little moisture (drier soil) and residents are likely to be outside conducting similar activities. Air sampling will not be conducted during times of heavy precipitation. The proposed schedule of project work follows:

Activity	Estimated Start Date	Estimated Completion Date	Comments
SSSP Review/Approval	June 16, 2004	July 10, 2004	
Mobilize to Site			
Sample Collection			
Laboratory Sample Receipt			
		July 19, 2004	

Laboratory Analysis	July 26, 2004	September 14, 2004	
Data Validation	September 15, 2004	September 30, 2004	
Draft Report	September 30, 2004		
Target Completion Date	October 30, 2004		

Decision Statement

The decisions to be made from this investigation are to:

- Determine whether airborne concentrations of asbestos generated by conducting ground cover cutting (“weed-whacking”) will exceed an acceptable target concentration (Appendix A);
- Determine whether airborne concentration of asbestos generated by conducting gardening activities (specifically rototilling) will exceed an acceptable target concentration; and
- Determine whether airborne concentrations of asbestos generated by a child playing in the dirt will exceed an acceptable target concentration.

Inputs into the Decision

The following information will be provided from project activities:

- Asbestos soil samples at activity-based locations will be obtained (or have previously been obtained), prepared, and analyzed by the following procedures: soil elutriation followed by ISO 10312 analysis. This information will be gathered through the project activities described in this SSSP if soil samples were not collected during residential and “hot spot” sampling.
- Air sampling will be conducted in the breathing zone of personnel performing specific tasks that mimic activities likely done by residents and/or workers.
- Real-time dust measurements will be collected with a personal dust monitor (DataRam PDR-1000) for input into dust emissions modeling.
- A meteorological weather station will measure wind speed, wind direction, relative humidity, temperature, and barometric pressure, in the immediate area of the activities.
- Soil parameters, including silt content, moisture content, and percent ACM by weight, will be measured for each activity-based location.

Sample Collection Information

Applicable sample collection Standard Operating Procedures (SOPs) will be followed, including **Field Activity Logbooks, Sample Packaging, Soil Sampling, General Air Sampling Guidelines, and Sampling**

Equipment Decontamination. Applicable SOPs and guidelines within the EPA Emergency Response Team (ERT) SOP #2015 *Asbestos Sampling* and the International Organization for Standardization (ISO) 10312 *Ambient Air – Determination of Asbestos Fibers: Direct-Transfer Transmission Electron Microscopy Method* will be followed.

To assess the loading levels of the filters and the subsequent ability to analyze them, some of the activities will initially be performed with personal pumps fitted with PCM/TEM filters which will be viewed by an analyst prior to conducting the activity-based sampling with PCM/TEM filters. Alternatively, the individual conducting the activity will be fitted with two pumps at different flow rates (e.g. 2.0 liters/minute and 1.5 liters/minute) with the inlet positioned at approximately the same position on the subject (halfway between the shoulder and neck). If loading levels exceed the analyst's ability to read the PCM/TEM filters, the activity will be repeated with the flow rate adjusted so that samples may be read via a direct analytical method.

Sampling will be conducted on MBK property where surficial cleanup was not completed in 2003 (MBK lots -A, -B, and -C). The task-based monitoring will involve the collection of 0.8 micron pore size filter cassette samples while the following three activities are performed:

- Activity (playing) in the dirt. Personnel will don appropriate personal protective equipment (PPE) and sampling pumps while mimicking children digging soil, putting the soil in a bucket, and dumping the soil back on the ground. The activity will be paced such that soil will be placed in the bucket and dumped every 5 minutes, regardless of the amount of material in the bucket. After repeating this activity three times and completing a set (15 minutes), the individual will turn 90 degrees, and continue the exercise in the same manner to complete another 15-minute set before rotating 90 degrees in the same direction and conducting another set. This activity will be repeated for a minimum of 2 hours (8 sets). The subject will be fitted with two personal sample pumps at two distinct flow rates and a personal dust monitor. The inlet to the filter will be at a height of approximately 2 feet above the ground. The meteorological station will be placed upwind within 50 feet of the designated activity area and will log the temperature, barometric pressure, relative humidity, wind direction, and wind speed. The child play activity will be conducted in an area measuring 5 feet by 5 feet. A discrete soil sample will be collected from the surface in the center of this area from a template measuring 8 inches by 8 inches to a depth of 4 inches.
- Gardening/Rototilling. Personnel will don appropriate PPE and sampling pumps and operate a rototiller for a minimum of 2 hours to loosen soil in the yard to a depth of approximately 1 foot. Again, the individual will wear two sample pumps at distinct flow rates and a personal dust monitor. To address the concern of exposure related to wind direction, the operator will till the

soil in one direction for 10 continuous minutes and rest 5 minutes, before turning 90 degrees to the right and repeating this 15-minute procedure for the duration of the sampling period. The operation will occur in an area that contains visual concentrations of ACM. A meteorological station will be placed upwind within 50 feet of the designated activity area and will log the temperature, barometric pressure, relative humidity, wind direction, and wind speed.

- **Weed (vegetation) cutting.** An electric-powered string trimmer will be operated by personnel wearing appropriate PPE and sampling pumps for a minimum of 2 hours. The operator will wear two personal sampling pumps at distinct flow rates and a personal dust monitor. Trimming will occur in a measured area with thick vegetation and concentrated levels of ACM. Trimming will occur in a side to side sweeping motion with the operator moving in a straight line for 10 minutes, resting 5 minutes, and turning 90 degrees to the right before repeating this 15-minute procedure for the duration of the sampling period. The meteorological station will be placed upwind within 50 feet of the designated activity area and will log the temperature, barometric pressure, relative humidity, wind direction, and wind speed.
- **Interleaved-composite soil samples.** A composite soil sample will be collected from the Gardening/Rototilling and Weed Trimming study area measuring 180 feet by 180 feet. The study area will be subdivided into nine equivalent 20 feet by 20 feet subsections. Within each subsection, a sample will be collected from an area measuring 8 inches by 8 inches with a 2 inch depth. A second composite sample will be collected over the same study area following this procedure with different locations sampled within the subsections. The subsection samples will be composited and homogenized for analysis.
- **The background sampler** will be in an upwind location to characterize ambient conditions and screen out alternate sources of contamination. A high volume air sampler will be utilized to collect in excess of 2,500 liters and achieve a detection limit below that of the personal air samplers. One ambient sample will be collected each day of the activity-based sampling as well as the day prior to commencing the activities.
- **The task-based activity sampling program** is contingent on dry weather. If the weather patterns are not conducive to air sampling, the event will be postponed. The electrical power sources for the high volume samplers may include gasoline-powered generators. To minimize potential interferences, the generators will be located at least twenty-five feet downwind of the air sampler.

Temporal Study Boundaries

In general, asbestos materials are stable substances that do not change chemically or physically over short periods of time. Asbestos fibers become airborne as a result of physical disturbances (or abrasion) which may include wind erosion.

The sampling event is being conducted to represent site conditions during a great deal of physical activity and should present exposure to airborne fibers under a “worst-case” scenario.

The Decision Rule

The following statements describe the “decision rules” to apply to this investigation:

- If the concentrations of contaminants are greater than the screening level (Appendix A), the area may be targeted for additional characterization or removal.
- If the concentrations of contaminants are greater than or less than the screening level, the area may be targeted for additional characterization.
- If the concentrations of contaminants are less than the screening level, the area may be characterized as not posing an unacceptable risk to human health or the environment, under the exposure conditions evaluated.

Limits on Decision Error

- Presume that the level of exposure to asbestos in an area of concern does not exceed the activity-specific screening level when, in fact, it does.
- Presume that the level of exposure to asbestos in an area of concern does exceed the activity-specific screening level when, in fact, it does not.

The first decision error could occur as a result of measurement error (e.g., the results of analysis erroneously reports asbestos concentration and density below the screening level) or sampling error (e.g., personnel block the intake to the filter, air circulation patterns resulted in heterogeneous distribution of asbestos, disturbance of asbestos was inadequate to entrain the fibers in air for sampling, sample pumps failed to operate within the required flow rate and collection time parameters). The second decision error could occur as a result of measurement error (e.g., the analytical results erroneously report asbestos concentration and density at or exceeding the site screening levels) or sampling error (e.g., air circulation patterns resulted in heterogeneous distribution of asbestos, sample pumps failed to operate within the required flow rate and collection time parameters).

All samples will be collected following applicable SOPs in the ERT SOP #2015, ISO 10312, and referenced in the 2003 Ecology and Environment, Inc. (E & E) Generic QAPP for Sampling at Removal Program Sites.

Sampling Pattern

- On the MBK -A, -B, and/or -C lots, three activities will be performed at designated locations (Figure 2). Each activity will be conducted and repeated twice in each area for a 2-3 hour period. These activities include: mimicking a child digging in the soil; weed trimming; and gardening (rototilling). Personnel will wear two personal monitoring pumps fitted with an appropriate mixed cellulose ester (MCE) filter set at a flow rate of 2 liters/minute and 1.5 liters/minute. The subject will also wear a personal dust monitor at his mid-section (belt). These samples are expected to represent exposure to the asbestos fibers for an individual conducting these activities.
- Activity-based sampling will be conducted in areas that are presently known to have concentrations of ACM in the soils (where applicable).

Numbers of Samples

- A minimum of 18 activity-based air samples will be collected at the site (not including duplicates and/or background) with 9 submitted for TEM analysis. The individual conducting the activity will be wearing 2 sample pumps at different flow rates to provide alternative filters for analysis if a filter becomes overloaded with particulate matter. Multiple runs of each activity will be completed to produce a minimum of 3 MCE filter cassettes from 3 runs per activity.
- One ambient background air sample will be collected for each day that activity-based sampling is conducted. The sample will be collected upwind of the locations of the task based sampling.
- A duplicate sample will be collected for each of the three task-based activities conducted. The duplicate sample pump will be set at the same flow rate with the intake of the cassette placed in the breathing zone of the individual (between the shoulder and the neck).

Sample Matrix and Target Analytes

- Activity-based air samples will be prepared and analyzed for asbestos content via the ISO 10312 TEM method at the START-subcontracted commercial laboratory as determined by the OSC.

See Tables 2-1, 2-2, and 2-3 for sample collection and analysis information. The Sample Plan Alteration Form (a blank form is included at the end of this document) will list project discrepancies (if any) that occurred between planned project activities listed in the final SSSP and actual project work.

Table 2-1

SAMPLE INFORMATION SUMMARY

Northridge Estates

Klamath Falls, OR

Project Sampling Schedule ^a	Parameter/Limits	Design Rationale	Sampling Design Assumptions	Sample Selection Procedures	Measurement Classification (Critical/Non Critical)	Nonstandard Method Validation
Air	Asbestos Sensitivity level of 0.0033 fiber/cc	To determine the levels of airborne contaminants generated by performing specific work and recreational activities at the site.	The work and recreational activities release asbestos fibers to the air.	Samples will be collected from potentially contaminated areas. ^b	Critical	PCM filter utilized.

^a All samples will be collected during the field event. The listed item is the decision area.

^b As indicated from previous investigations at the site and from on-site observations.

Key:

- Critical
- = Required to achieve project objectives or limits on decision errors
- na
- = not applicable

Table 2-2
SAMPLE ANALYSES SUMMARY
Northridge Estates
Klamath Falls, OR

Matrix	Location^a	Analytical Parameters/Method	Sample Preservation	Technical Holding Time^{bc}	Sample Container(s)
Air	TBD	Asbestos/ ISO 10312 (TEM)	Kept within plastic bag with minimal disturbance.	NA	0.8 micron PCM Cassette (25 mm diameter).

^a = Samples will be collected from MBK lots -A, -B, and/or -C in areas of known soil contamination.

^{bc} = Technical holding times have been established only for water matrices. Water technical holding times were applied to air, sediment, soil, and product samples where applicable; in some cases, recommended air and sediment/soil holding times are listed.

Key:

TBD = To be determined.

NA = Not applicable.

ISO = International Organization of Standards.

PCM = Phase Contrast Microscopy.

TEM = Transmission Electron Microscopy.

The laboratories' DQOs for completeness and the field team's ability to meet the DQO for representativeness are set at 90%. Precision and accuracy requirements are outlined in Table 2-3.

Table 2-3

QA/QC ANALYTICAL SUMMARY and FIXED LABORATORY ANALYTICAL METHODS

Northridge Estates

Klamath Falls, OR

Laboratory	Matrix	Parameters/Method	Method Description/ Sensitivity	Total Field Samples ^a	QA/QC Sample Summary			Total Field and QA/QC Analyses/ Containers ^b	Precision and Accuracy
					Method Blank	Duplicates	Lot Blanks	Trip Blanks	
Commercial Laboratory	Air	TEM Asbestos/ ISO 10312	TEM/ 0.0033 fibers/cc	15	na	3	2	na	5 Per ISO Method
Commercial Laboratory	Soil processed for air analysis	TEM Asbestos/ ISO 10312	TEM/0.0033 fibers/cc	3	1	1	Same lot.	na	1 Per ISO Method

^a Total number of field samples is estimated.^b Total analyses and containers includes both field and QA/QC aliquots to be submitted for fixed laboratory analysis.

Key:

cc = Cubic centimeter.

ISO = International Organization for Standardization.

na = not applicable.

QA = Quality assurance.

QC = Quality control.

TEM = Transmission Electron Microscopy.

Sample Plan Alteration Form

Project: Northridge Estates

TDD Number: 03-07-0011

Changes from Final SSSP (include rationale, decision area, matrices, parameters, equipment, personnel, etc.):

APPROVALS			
Name	Title	Signature	Date
Dan Heister	On Scene Coordinator		
Bill Mehnert	START Project Manager		
Mark Woodke	START Quality Assurance Officer		

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